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**BIG SPRING
RECHARGE AREA**

**SOLE SOURCE
AQUIFER PETITION**

ADDENDUM

Prepared for:

Arthur L. Sullivan, Superintendent
Ozark National Scenic Riverways
National Park Service

Prepared by:

Thomas Aley, Director
Ozark Underground Laboratory
Protem, Missouri

Wilgus B. Creath
W. B. Creath & Associates, Inc.
Colorado Springs, Colorado

May, 1990



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22 May, 1990

Mr. Arthur L. Sullivan, Superintendent
Ozark National Scenic Riverways
National Park Service
P.O. Box 409
Van Buren, Missouri 63965

Re: Big Spring Recharge Area
Sole Source Aquifer Petition
Response to EPA Comments

Dear Mr. Sullivan:

This addendum is written in response to the questions submitted by the United States Environmental Protection Agency on January 17, 1990. The purpose of the questions and comments was to seek clarification of information provided in the petition dated October, 1989 and to request more information where needed in order for the petition to be considered complete. The responses below are numbered to correspond to the list of questions and comments as submitted by the Environmental Protection Agency.

Comment No. 1: *A map indicating the boundaries of the Ozark National Scenic Riverways in relation to the petitioned SSA boundaries should be included.*

Figure 1 of this Addendum displays the boundaries of both the Ozark National Scenic Riverways and the Eleven Point Wild and Scenic River and their relationship to the Project Review Area.

Comment No. 2: *If feasible, geologic cross-sections of the petitioned area need to be included.*

A geologic cross-section was not included in the Sole Source Aquifer Petition because public data sufficient in both quantity and quality to construct a reasonably accurate cross-section are scarce and the private data are not now available to us. In our opinion, a cross-section constructed with the available data would be overly simplistic and possibly misleading; therefore, we chose to include only the stratigraphic section as depicted on Figure 5 of the petition.

It can be noted that the general dip of the rocks is toward the southwest and thus away from

Big Spring: therefore, most of the waters moving toward Big Spring through the groundwater system are moving updip.

Comment No. 3: *A map showing the location of the "New Lead Belt" with respect to the petitioned area should be included.*

A map of the Southeast Missouri Lead District showing the relationship of the Project Review Area to the "New Lead Belt" is shown on Figure 2 of this addendum.

Comment No. 4: *Please indicate the scale for the map diagrams.*

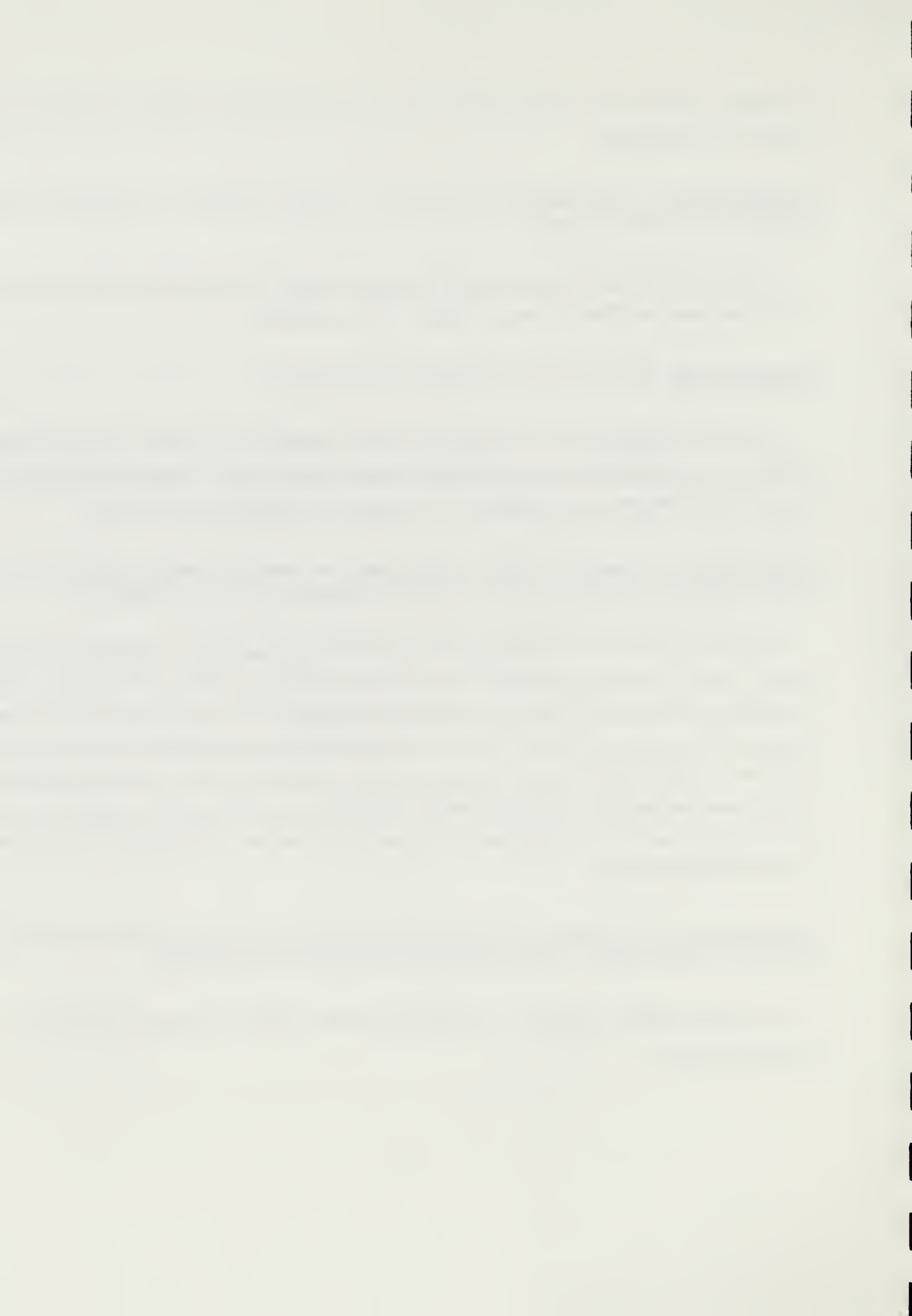
The scale of all maps in the initial petition and in this addendum is 1:250,000. The scales were inadvertently omitted from the maps in the petition dated October, 1989. A graphic scale drafted on Figure 1 of this addendum is applicable to all the maps in the original petition document.

Comment No. 5: *Though not critical at this juncture, we would at some point like to have at least one large scale topographic map (i.e., 7.5 or 15-minute quads) of the Petitioned Area.*

The area is best shown on the Rolla and Poplar Bluff Army Map Service 1:250,000 scale map sheets. This is the base map which we used for our map illustrations in the petition. The 15-minute quadrangle maps of the petitioned area are mostly out of print and those which are available are very much out of date. Portions of the petitioned area and immediately adjacent lands are shown on eight of the 15-minute quadrangle maps. It requires 26 of the 7.5-minute quadrangle maps to cover the petitioned area and immediately adjacent areas. Because of the number of map sheets required, we believe that the map incorporated in the petition is probably the best general map for the petitioned area.

Comment No. 6: *Correction or a clarification is needed concerning two different population figures given in the petition. Page 4 states 10,412 persons; page 2 says 20,000.*

The 10,412 figure is correct. The 20,000 population figure appearing on page 2 is a typographical error.





Comment No. 7: *The petition indicates on page 3 that the boundaries of the petitioned area were established by examination of topographic maps, dye tracing studies, etc.; however, it still isn't entirely clear what the hydrogeologic basis is for the boundaries depicted in the petition. In other words, given that the aquifer system extends beyond the petitioned area, what is the justification for the given boundaries of the petitioned area.*

The Sole Source Aquifer (SSA) petition is for the aquifer system which contributes waters to Big Spring. The aquifer system *does* extend beyond the petitioned area, yet those portions of the aquifer outside the petitioned area *do not* contribute waters to Big Spring.

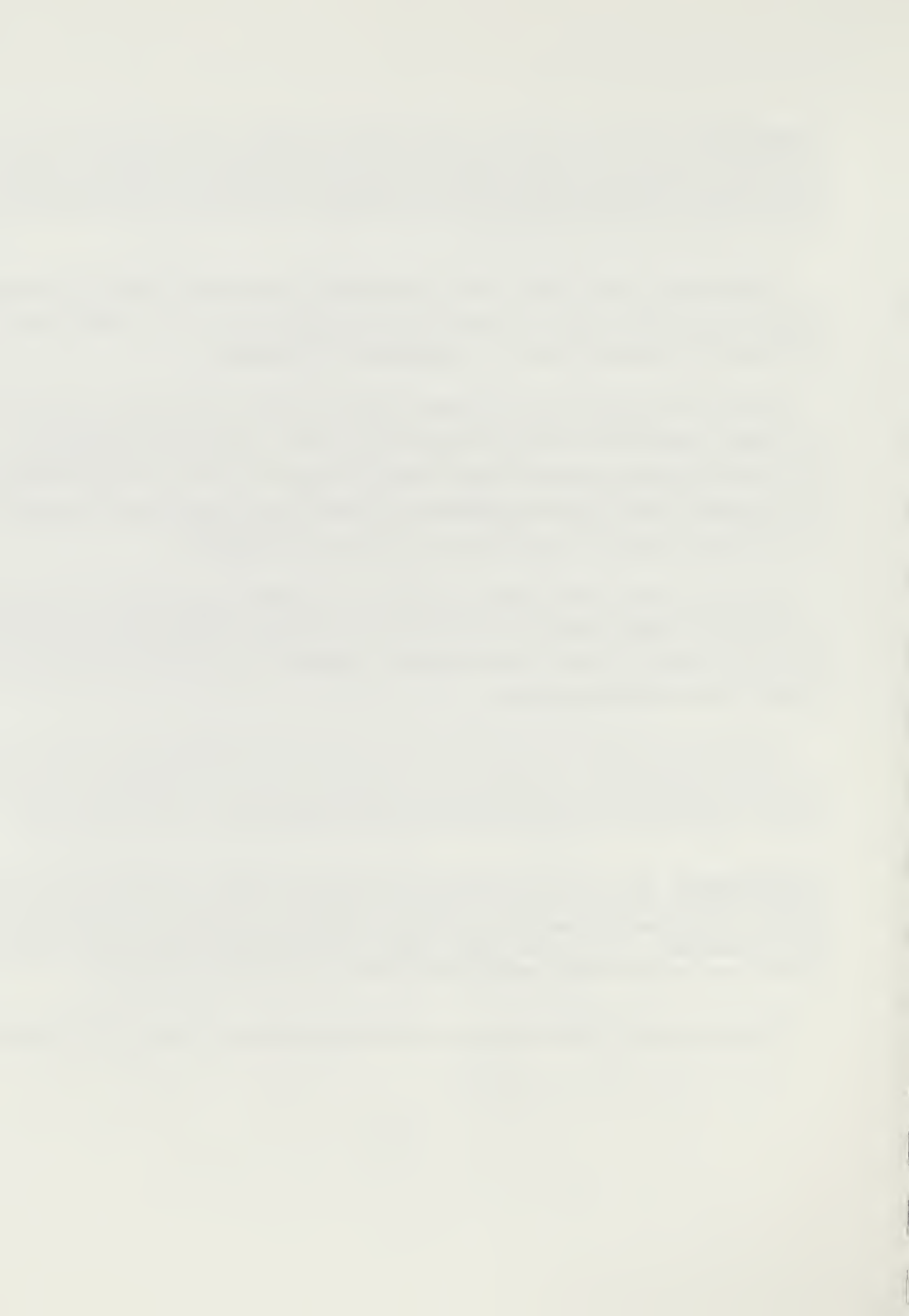
Figure 2 of the petition shows a "Streamflow Source Area" located west of the area which is the "Aquifer, Aquifer Recharge Area, and Aquifer Service Area". Groundwater tracing has shown that waters entering the groundwater system within the "Streamflow Source Area" move through the groundwater system to Greer Spring and/or to Mammoth Spring. No groundwater tracing from the "Streamflow Source Area" has resulted in tracer recovery from Big Spring.

During storm periods there is surface runoff from the "Streamflow Source Area" which reaches the Big Spring Aquifer Recharge Area. Some of this water sinks into the groundwater system and subsequently reaches Big Spring. For this reason, the "Streamflow Source Area" can impact water resources within the petitioned aquifer.

We believe that petitioning for designation of the aquifer which contributes groundwater to Big Spring is a hydrogeologically appropriate approach and is consistent with the Sole Source Aquifer program. The recharge area for the Big Spring Aquifer is a defined portion of the regional aquifer.

Comment No. 8: *Please clarify the meaning of the statement on page 4, last paragraph, first sentence, "Three public water systems now serve the population centers within the petitioned area. These are Birch Tree, Mountain View, and Winona." Do those three public water systems serve other communities. If so, please identify those other communities and determine if their populations are included in the Population Served figures given on page 5 of the petition.*

There are only three public water systems within the petitioned area. These are the individual



systems which serve the towns of Birch Tree, Mountain View, and Winona; each town has one of the systems. None of these systems serve other communities. The Population Served figures given on page 5 of the petition are correct and represent the populations served within each of the respective towns.

Comment No. 9: *According to our map, there appear to be a number of other communities in the service areas for which there is no data. In addition to Fremont, Van Buren, and Willow Springs, which appear to coincide with certain well locations shown on Figure 4, there is: White Church, Pomona, Olden, Peace Valley, Thomasville, Wilderness, Handy, Eastwood, Chicopee, Bartlett, and Teresita. It would strengthen the petition to include information on those communities such as their drinking water source, population served, capacity, consumption, etc.; that is, the same kind of information given on page 5 of the petition for Birch Tree, Winona, and Mountain View.*

Figure 4 is captioned "Location of Public Water Supplies Including Well Depths and Water Yields in Petitioned Area". The caption should have indicated that the wells shown were both within and near the petitioned area. We showed data on a number of wells in areas outside (but near) the petitioned area to help the reader better understand typical well depths and water yields found in the region.

Public water supplies serve water to the public. They include municipal water supplies and public water supply districts. Public water supplies also include wells which supply, for example, schools and restaurants; these are not municipal water supplies. The comments on page 4 and 5 of the SSA petition related specifically and exclusively to *municipal water supplies*. We apologize for the confusion. There are no rural water supply districts within the petitioned area.

Table I of this addendum summarizes information on each of the communities noted in the EPA comments. As the reader will note, many of these "communities" are simply areas of slightly concentrated rural settlement. Several of the communities are located outside of the petitioned area; some of these are within the "Streamflow Source Area" (see Figure 2 in the original petition). There are a few other small crossroad settlements within the petitioned area; none of these are served with municipal water.

Small Communities in and near the Petitioned Area

Community	Population	Within Petition Area?	Served by Municipal Water Supply?
Bartlett	rural <15	Yes	No
Chicopee	110	Yes	No
Eastwood	50	Yes	No
Fremont	107	Yes	No
Handy	rural < 15	Yes	No
Olden	rural <15	No, within streamflow source area	No
Peace Valley	60	Yes	No
Pomona	200	No; within streamflow source area	No
Teresita	15	Yes	No
Thomasville	100	Yes	No
Van Buren	714	No	Yes
White Church	75	No; within streamflow source area	No
Wilderness	100	Yes	No
Willow Springs	2045	No; within streamflow source area	Yes

TABLE 1

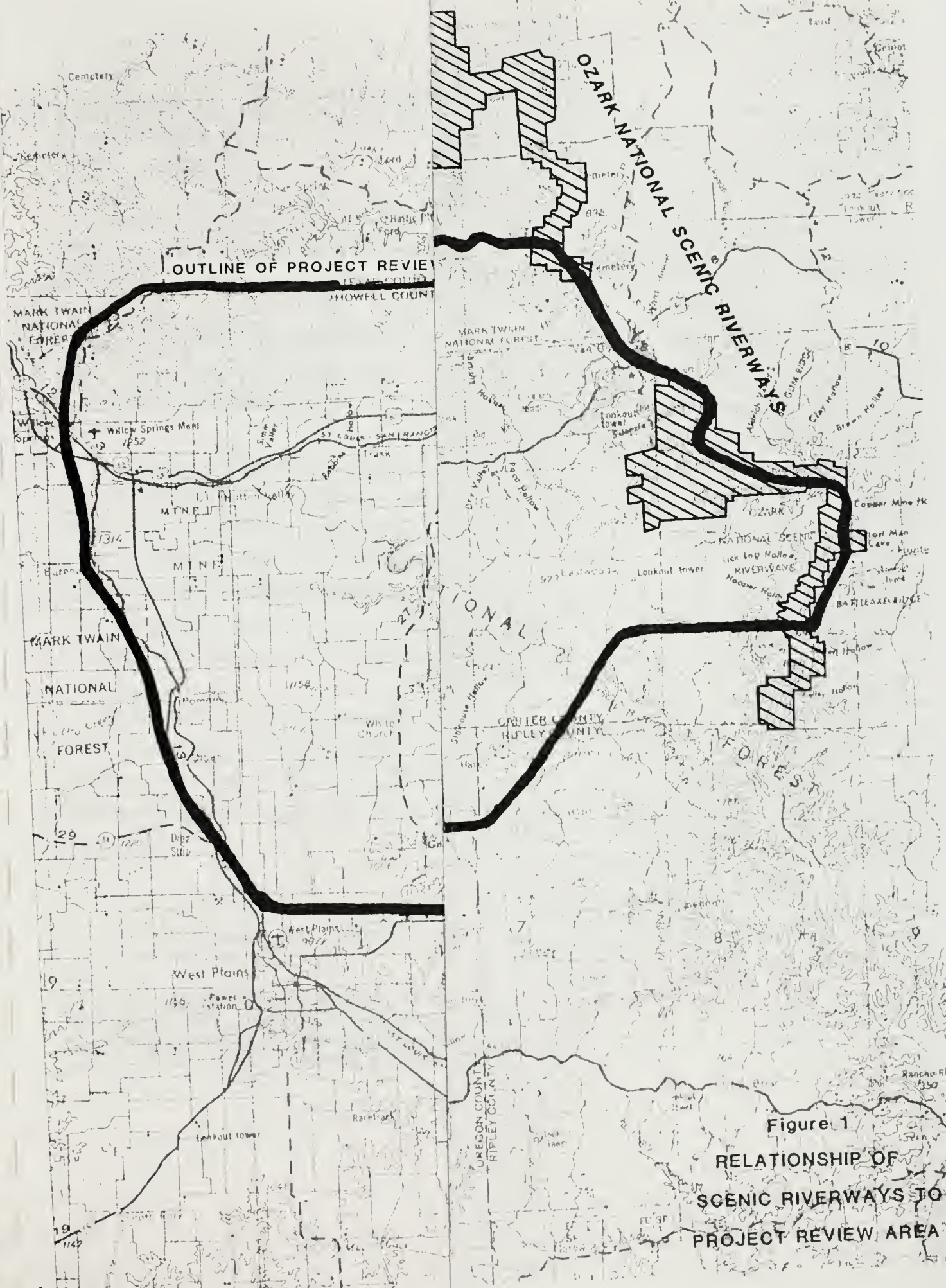


Figure 1
 RELATIONSHIP OF
 SCENIC RIVERWAYS TO
 PROJECT REVIEW AREA

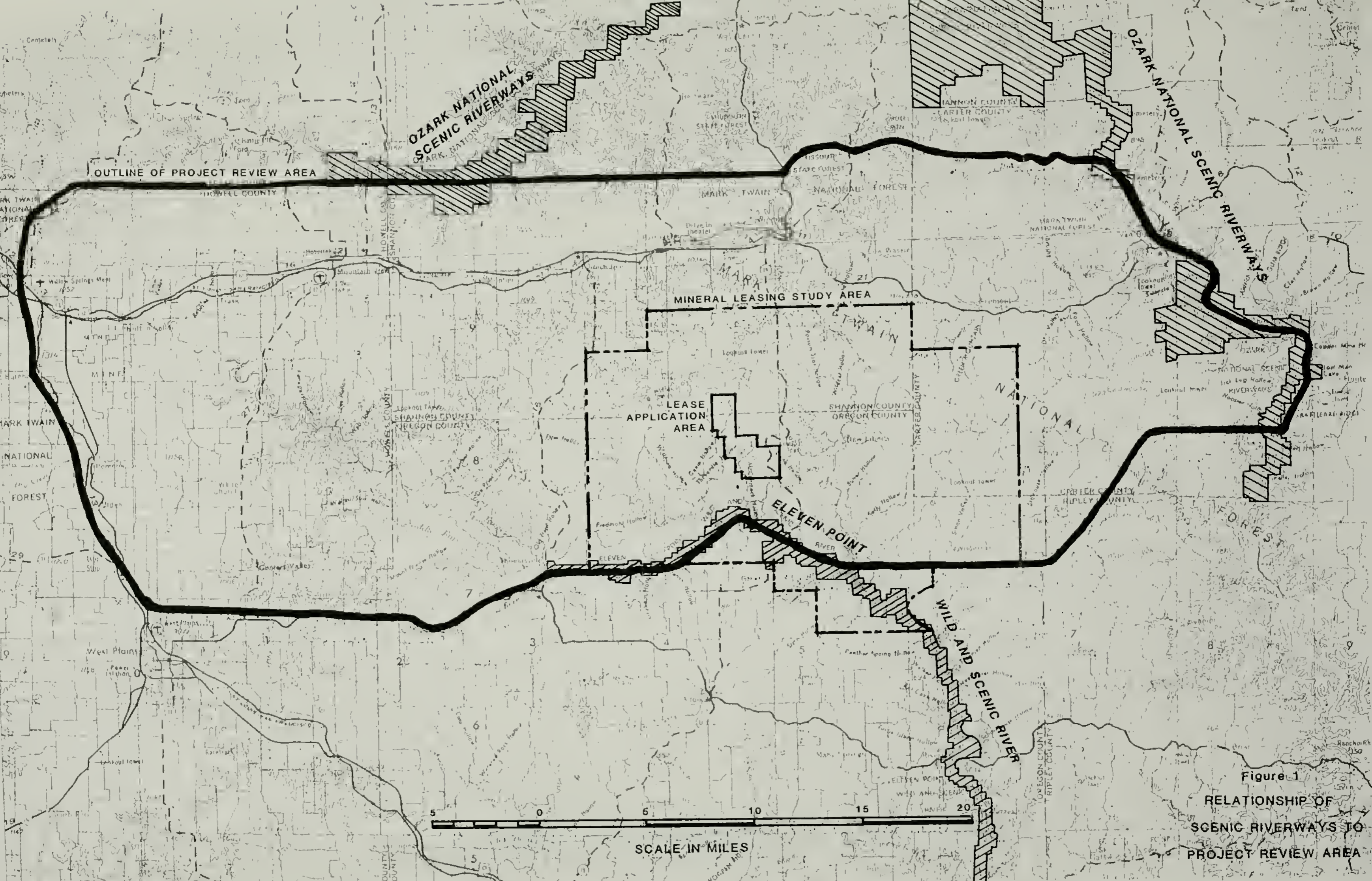


Figure 1
 RELATIONSHIP OF
 SCENIC RIVERWAYS TO
 PROJECT REVIEW AREA

Comment No. 10: *While private well information is more difficult to obtain, some attempt should be made to determine if there are any Department of Health, County Health, or State Survey records indicating groundwater use (i.e., private wells, springs) in the aquifer service area, if possible.*

Well logs, water tests, and other similar records for the petitioned area are very incomplete and include only a few percent of the total wells in the area. However, based upon our experience in the area, we have developed the following estimates of private water supplies in the petitioned area.

The rural population of the petitioned area is 6,724. A common value used in Missouri for estimating individuals in a household is 3.7. Using this value, there are approximately 1,800 rural households in the petitioned area.

Essentially every household in the petitioned area has a private water supply. In a few cases a well may serve a couple of houses; in other cases, there may be multiple wells serving a single residence. We estimate that approximately 90% of the rural households in the petitioned area are served by individual wells; this represents 1,620 wells. We further estimate that about 8% (145) of the rural households derive their drinking water supplies from springs; in some cases the spring water is piped into homes, in other cases it is hauled. Approximately 2% (35) of the rural households derive their drinking water from cisterns.

Mountain View, Birch Tree, and Winona are served by municipal water supplies, yet some residents of these communities continue to use private wells on either a routine or periodic basis. The population of these three communities is approximately 3,688; this represents approximately 1,000 households. We estimate that 10% of these households (100) continue to make some use of private wells.

Based upon the above calculations, there are approximately 1,720 private wells in the petitioned area and about 145 residences are served by springs.

Comment No. 11: *The petition affirms that the Eleven Point River and the Current River are non-viable as alternative sources of drinking water because those sources are too distant from the small population centers. This assertion needs more support. Some questions to consider are: What, if applicable;, are the normal pipeline distances in the local areas? Would the pipeline*

distances involved, by tapping into the Current and Eleven Point Rivers, exceed what would be deemed normal to the local areas? In other words, would use of those alternative sources require piping water over an unreasonable or uncommon distance? Are the Current and Eleven Point Rivers, as possible alternate sources, economically feasible to tap into, or would that present an unusual economic burden to those communities in the service area? Is access to the alternative source precluded due to any institutional constraints? For more guidance on Alternative Water Supplies, we suggest you consult the Petitioners Guidance, pages 8-15 and 21-22.

Step 1 is to identify all current sources of drinking water which supply water to the aquifer service area. This was done in the initial petition. Aside from a few individual cisterns, groundwater is the only source of drinking water in the aquifer service area.

Step 2 is to complete a "current drinking water sources" matrix. This has been done and is shown as Figure 3 in the initial petition.

Step 3 is to identify all potential alternative sources of drinking water which could supply drinking water to the aquifer service area. A potential source is any surface water or groundwater near the aquifer service area which could potentially be used as a source of drinking water. "Near" is defined as being within a distance normal to the local area for tapping into a water source. For example, if several surrounding communities of the same size have 2-3 mile pipelines leading to rivers or reservoirs, "near" would be defined as 2-3 miles.

There are no municipal water supplies which use surface waters in the local area (Missouri DNR, 1982). Even towns located on the Current River (Van Buren and Doniphan) or on the Jacks Fork River (eminence) rely upon groundwater rather than on river water supplies. As a result, normal pipeline distances are strictly those associated with distribution lines and do not include transmission lines from a point of water withdrawal to an area being served.

The petitioned area is not served by rural water districts (public water supply districts). Missouri DNR (1982, page 83) comments as follows relative to areas where rural water supply districts are located:

Water districts are geographically concentrated in three kinds of regions. The largest districts are in regions where urbanization has spread beyond the corporate limits of cities and into which municipal water supplies have not expanded. Water districts have also been established in

the larger resort and retirement areas in the Ozarks. A third region of water districts is northern Missouri, where groundwater sources tend to be of poor quality and streams have poorly sustained base flows.

Let us suppose that a water transmission line were constructed to serve the towns of Fremont, Winona, Birch Tree, and Mountain View. This would represent a population of approximately 3,795 people. If waters were withdrawn from the Current River near Van Buren to serve these communities, it would require about 42 miles of transmission lines in addition to the existing community distribution lines. If waters were withdrawn from the Eleven Point River at the Missouri Highway 19 crossing, it would require about 48 miles of transmission lines. Both of these distances are excessive and fail to comply with the definition of "near" quoted earlier. As a result of this, steps 4 through 12 are not relevant since there is no alternate surface water or groundwater supplies "near" the aquifer service area. Furthermore, it is obvious that over 40 miles of water transmission lines to service 1,000 water connections (and less than 40% of the total population of the petitioned area) is an unworkable approach.

In summary, the petitioned aquifer is the sole source of drinking water in the petitioned area. There are no viable alternate water supplies. Over 60% of the population lies outside of the towns of Mountain View, Birch Tree, Winona, and Fremont. The rural settlement is so sparse as to make the financing of public water supplies for the area financially impossible; this is compounded by the fact that the area is characterized by some of the lowest per capita incomes of any areas in Missouri.

Additional Comment: In the document dated October, 1989, we state on page 3, five lines from the bottom, that ... "The total petitioned area encompasses approximately 967 square miles." This should be corrected to read ... "The Streamflow Source Area is approximately 185 square miles and the Aquifer, Aquifer Recharge Area, and Aquifer Service Area total approximately 782 square miles. The total Project Review Area (which is the sum of these two values) encompasses approximately 967 square miles. The correct value for the petitioned area is therefore 782 square miles.

References

Missouri Dept. Natural Resources, 1982, Missouri Water Atlas, 97 p.

Missouri Dept. Natural Resources, Div. Env. Quality, Public Drinking Water Program, 1987,
Census of Missouri public water systems, 183 p.

